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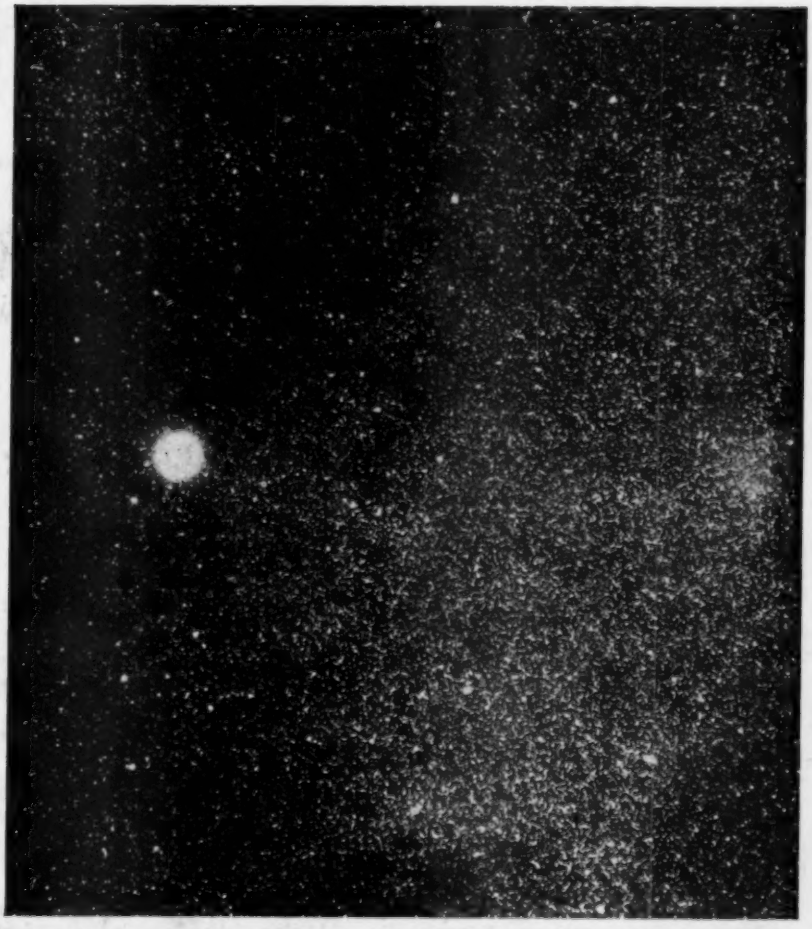
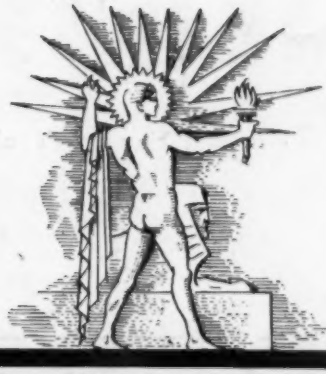
SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE •





December 6, 1941

Heart of Our Galaxy

See Page 357

A SCIENCE SERVICE PUBLICATION

Do You Know?

Carloads of *rock salt* are used each winter to salt streets and roads as a way of removing snow and ice.

Federal scientists say that *chimney swifts* never touch ground except by accident, spending their lives in the air and roosting against chimney walls.

Moving picture films are being used to speed up training of labor, to show salesgirls, for instance, how to put a purchase in a sack—and how not to.

In speed-up methods of painting, railroad cars now get a *wet-on-wet* job, in which specially formulated paint is sprayed over a partly dried prime coat.

Northwestern University has the world's *quietest room*—a 50-ton sound-insulated concrete box mounted on rubber, for testing sound-absorbent materials.

When most birds drink they dip in the bill, tip the head up and let the water flow down the throat, but a *mourning dove* takes a long draught keeping its bill in the water.

An American sailor has sent to the University of Kentucky's Museum of Geology two glacial boulders from *Iceland* and a piece of Icelandic sandstone from a Viking church ruin.

A *fish tragedy* of 100,000,000 years ago is shown in a slab of chalk in the British Museum, where fossil remains of a dozen fish are caught in contortions suggesting sudden asphyxiation.

GENERAL SCIENCE

Vice-President Wallace Dedicates New Building

UPON the occasion of the dedication of the new building of Science Service and celebrating 20 years of Science Service activity. The Vice-President of the United States, Henry A. Wallace, will deliver the principal address in a half-hour radio program over the nationwide network of the Columbia Broadcasting System.

The dedication program will begin at 1:30 p.m. EST and will originate from the new Science Service building at 1719 N St., N.W., in Washington.

Leaders in science will participate, among them Dr. Vannevar Bush, president of the Carnegie Institution of Washington and director of the Office of Scientific Research and Development, Dr. Edwin Grant Conklin, president of Science Service and executive officer of the American Philosophical Society, Dr. Harlow Shapley, director of Harvard College Observatory and vice-president of Science Service.

Science News Letter, December 6, 1941

QUESTIONS DISCUSSED IN THIS ISSUE

Most articles which appear in SCIENCE NEWS LETTER *are based on communications to Science Service, or on papers before meetings. Where published sources are used they are referred to in the article.*

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SCIENCE NEWS LETTER

Vol. 40 DECEMBER 6, 1941 *No. 23*

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MEDICINE

Conquest of Liver Cirrhosis By Diet Now Seems Likely

Casein, Principal Milk Protein, and One Member Of Vitamin B Group Help Hitherto Hopeless Malady

CHEESE and a vitamin may be the future cure for cirrhosis of the liver, fatal condition once known as "drunkard's liver."

Success in both treating and preventing the condition with a B vitamin and casein, chief protein of milk and cheese, is announced by Dr. J. V. Lowry, Dr. Floyd S. Daft, Dr. W. H. Sebrell, Dr. L. L. Ashburn and Dr. R. D. Lillie, of the U. S. Public Health Service.

Laboratory rats were the patients in this work, but the report comes hard on the heels of a report from two New York doctors that human liver cirrhosis patients were successfully treated by "a highly nutritious diet supplemented with vitamin B concentrates."

Taken together, the reports suggest that the day is fast approaching when a diagnosis of cirrhosis of the liver will no longer be equivalent to a death warrant, especially since the New York doctors happened to have given their patients a diet which seems to have included the two substances that helped the rats.

Choline and casein are the two diet constituents successfully used by the Public Health Service scientists to treat and prevent liver cirrhosis in their rats. They had previously discovered they could produce the condition by keeping the rats on a diet lacking in these substances, whether or not they got alcohol with the diet.

Choline is believed to be one of the B vitamins. It is always found with these vitamins in foods and is in most vitamin B concentrates.

The New York scientists, Dr. Arthur J. Patek, Jr., and Dr. Joseph Post, started their diet treatment of human liver cirrhosis patients in 1939, more than two years before this report. They based the treatment on their observation that, in addition to signs of liver failure, the patients were malnourished and particularly lacked the B vitamins.

Almost half of these patients, 45%, were alive at the end of the second year, they now report (*Journal of Clinical Investigation*, September).

This is more than twice the percentage of cirrhosis patients who lived two years without the diet treatment. Both treated and untreated patients had reached the stage in cirrhosis where ascites, or fluid in the abdomen, had developed. In the diet-treated patients this and other symptoms including jaundice disappeared and 20 of the 54 were well enough to resume fully their previous activities.

These patients probably got both choline, from the vitamin B concentrates, and casein, from milk or cheese which would undoubtedly be included in a "highly nutritious diet."

Proof that these two diet constituents can relieve liver cirrhosis in human patients, however, depends on the trial of these specific substances which the Public Health Service scientists say should be made.

In the rats, the treatment helps the animals to recover by enabling the liver to regenerate or grow enough new cells to function normally and enable the animals to live. The part of the liver that has been destroyed by the disease is not affected by the treatment.

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MEDICINE

Vitamins Help Doctors Treat Rare Disease

SUCCESSFUL treatment of Raynaud's disease, characterized by spasms of the feet and hands, with the vitamin B group is reported by Dr. Rose Spiegel, Mt. Sinai Hospital, New York, in the hospital's journal (Nov.-Dec.).

The disease is most common among women and attacks are usually brought on by chilling of the hands and feet. Occasionally it is associated with thickening patches of skin on the fingers and toes. (*Turn to next page*)

ASSEMBLY PLANT

Fiberglass and steel are being used together in the walls of this huge aircraft assembly plant at Fort Worth to carry out plans of Army engineers to insure working comfort and operating efficiency in the 2,000,000 square feet of floor space within the air-conditioned, windowless layout. Consolidated Aircraft Corporation will run the plant.

In the past it has been cured by surgical removal of the nerves affecting the blood vessels of the hands and feet, but often the operations were not successful. This was especially true when the disease was limited to the hands. More conservative medical treatment was even less reliable.

Last year, however, a young houseworker with Raynaud's disease was discovered to be existing on a diet of rye bread and coffee three times a day. She was given vitamin capsules and in ten days her hands no longer blanched in cold water and the spasms disappeared.

The case led to vitamin treatment of 21 patients with Raynaud's disease at Mt. Sinai Hospital, with results which implied that vitamin deficiency is an important factor in provoking the disease. The patients were treated with either "total vitamins" or with vitamin B complex for a period of from six weeks to a year. Dr. Spiegel reports that "fifteen showed distinct relief." The vitamin B group, Dr. Spiegel believes, is the effective agent rather than the other vitamins.

Science News Letter, December 6, 1941

PALEONTOLOGY

Rare Fossil Beast Found Among Wyoming Treasures

BONES of one of the rarest, strange American animals of 40,000,000 years ago, spurned by pot hunters, have been happily saved for science by Smithsonian Institution paleontologists.

Found in Wyoming in the Bridger Basin region, the long-extinct creature is a stylinodont. Dr. C. Lewis Gazin, discoverer of the rare fossil, says that stylinodonts looked very much like sloths, but were not ancestors of South America's present-day sloths, nor of the ground sloths that were in existence in our country as recently as the last Ice Age. Pronounced "one of the most interesting finds of the summer," Dr. Gazin's stylinodont was found partly dug up by amateurs of the un-scientific-minded variety dubbed "pot hunters." Probably, he says, they thought the bones unimportant.

A giant squirrel that was about as big as a woodchuck is another find of the season by Dr. Gazin. Its skull was three to four inches long. Modern squirrels cannot claim Paramys, as the big squirrels are called, for their direct ancestors. These giants apparently vanished millions of years ago, while some smaller and more alert relatives survived to perpetuate the squirrel line.

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CHEMISTRY

Gasoline and Rubber Produced By "Freezing" Waste Gases

Process Hitherto Used Mainly by Russians Tried With Promising Results by American Oil Technicians

HIGH octane gasoline and synthetic rubber can be produced from waste gases of the steel and petroleum industries by application of a low temperature technique secretly developed in Russia, Prof. Cecil T. Lane of Yale University announced in an address to the Sigma Xi Society, in New Haven, Conn.

These gases are mixtures of valuable industrial gases, Dr. Lane continued. Each has a different liquefaction and freezing point, so that by lowering the temperature far below the freezing point of water, the different gases may one by one be frozen out and separated into pure components. Then they can be put together again in the various ways and proportions necessary to produce gasoline, rubber, and other vital defense materials, for which they provide an almost inexhaustible source of raw materials.

The surprisingly strong resistance of the Russians to the German invasion, Dr. Lane attributed in large part to their development of the low temperature industry, in which they were far ahead even of Nazi Germany. In this country the industry is only in its infancy, but Dr. Lane foresaw that it would open up many new avenues in synthetic manufacturing.

Dr. Lane demonstrated the Peter L. Kapitza machine for producing liquid helium at a temperature 455 degrees Fahrenheit below zero. It is the only machine of its kind in the Western Hemisphere and there are only five other places in the world where liquid helium can be produced. The machine was built from a sketch sent from England before the outbreak of the present war.

Science News Letter, December 6, 1941

ASTRONOMY

Mexico To Have Most Powerful Telescope in the Tropics

Site 8,000 Feet Above Sea Level Considered Highly Favorable For Observations in Southern Hemisphere

MEXICO is building a new national observatory which will house a 24-30 inch Schmidt photographic telescope, the most powerful in the tropics, Dr. Bart J. Bok, astronomer of Harvard College Observatory, has announced (*Sky and Telescope*).

Other equipment will include a 12-inch reflector for visual observations and two or three cameras of the Ross type with apertures of three to five inches. All equipment will be purchased with funds provided directly by President Camacho of Mexico.

The observatory will be located on a hill ten miles south of the city of Puebla, which is 80 miles east of Mexico City. This is a very favorable location for observation of the southern hemisphere. Latitude of the observatory is 19 degrees north of the equator, which means that the sky can be seen to within 19 degrees of the south celestial pole. The site is nearly 8,000 feet above sea level.

The work of the observatory will tie in closely with that of the Harvard College Observatory and of the Mexican observatory at Tacubaya. It will consist largely of observations of southern variables and of star counts, colors, magnitudes and spectra for the southern hemisphere.

Director of the observatory will be Luis Enrique Erro, assisted by Dr. Carlos Graef, both of whom have already spent a year at Harvard College Observatory with its director, Dr. Harlow Shapley.

Formal dedication of the new observatory is expected to be in February.

Science News Letter, December 6, 1941

ASTRONOMY

100-Inch Telescope Has Speed Planned for 200-Inch Mirror

Work of 200-Inch Mirror Expected To Equal That Of 400-Inch Instrument Figured on 1928 Basis

See Front Cover

RECENT advances in optics and photography have increased the efficiency of the 100-inch Mount Wilson reflector until it has now attained the speed expected of the 200-inch when plans for its construction began in 1928. This was revealed by Milton L. Humason of the Mount Wilson Observatory staff in a statement to the Astronomical Society of the Pacific.

But he added that these gains could also be applied to the 200-inch telescope so that astronomers may look forward to a corresponding increase in power of the Mount Palomar instrument over that originally planned. While they have been building a 200-inch, the astronomers are getting a 400-inch mirror in terms of light delivered by 1928 standards.

He cited as a striking example of these improved methods the fact that for the first time a photograph has been obtained showing the center of our stellar system, the vast nucleus of stars around which our entire galaxy rotates. It is estimated that there are 800,000 stars per square degree upon the plate. The photograph was made possible by using plates sensitive to red light instead of blue. Red light is much more penetrating than blue, and thus easily pierces clouds of cosmic dust revealing stars thousands of light years away. Ordinary plates sensitive to blue light only would show stars but a few light years distant.

Although red-sensitive plates have been improved enormously in the last ten years there has been no corresponding gain for blue-sensitive plates. They may be speeded up slightly by "baking" them for three days in an oven at 120 degrees Fahrenheit, or by putting them in an air-tight chamber with a large drop of mercury.

In about two-thirds of modern astronomical observations it is necessary to pass the starlight through several correcting lenses before it reaches the photographic plate. Fully one-fourth of the beam is lost by reflection and scattering of light at the lens surfaces. This has been greatly reduced by coating them with non-reflecting chemical films of lithium and calcium fluorides about four millionths of an inch thick.

"An astronomer using long exposures fully appreciates the significance of these gains," Mr. Humason said. "To photograph spectra of faint extragalactic nebulae formerly required exposures from 10 to 30 hours long. Now the same spectra can be photographed in one-third the time, thus enabling the astronomer to observe three times as many nebulae."

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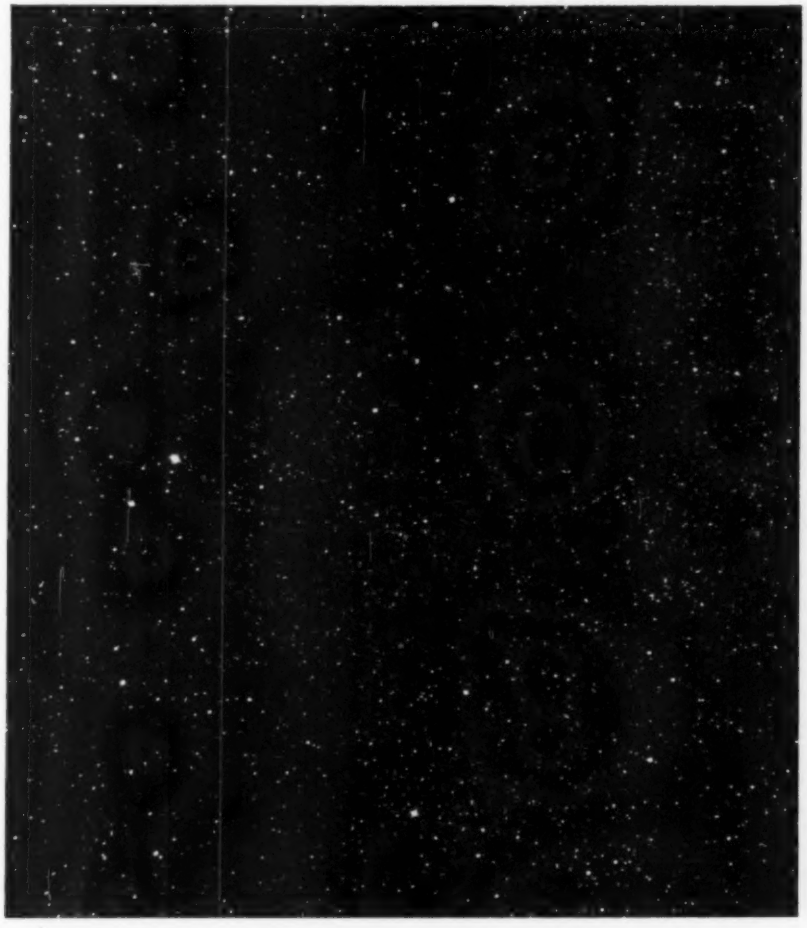
The Cleveland Museum of Natural History makes natural-looking *foliage* out of beeswax, cotton, wool and wire, using a mold to get leaf impressions and painting the wax-and-cotton molded leaf with oil paints.



GALAXY HEART IN BLUE

The photograph on the front cover is the center of our stellar system as photographed in red light through the improved 100-inch reflector of Mt. Wilson Observatory. It shows for the first time the great concentration of faint stars at the nucleus of our galaxy. Contrast it with this photograph which shows the same region in blue light. The red-light photograph on the cover is estimated to have 800,000 stars per square degree. Only globular star clusters show higher concentration. The photograph on this page shows fewer stars because blue light from the more distant stars is stopped by intervening cosmic dust. Each of these photographs by Dr. W. Baade covers an area about the size of the full moon.

VOLCANOLOGY

Earth's Eruptions

Volcanoes, Like Earthquakes, Generally Are Found Where Altitude Differences Are Extreme, Crust Weak

TITANIC builder and destroyer is the volcano.

Together with its companion phenomenon, the earthquake, both evidences of a living earth enclosed in the sun-heated shell, it has intrigued the imagination of man from the beginnings of history.

Only within the last generation, however, have plausible theories, supported by an accumulation of experimentally determined facts, been possible. The roots of a volcano are many miles deep. There is no possibility of actual observation of what happens in the depths of the earth before an eruption, and everything must be deduced from surface phenomena.

Much observation and experimentation leading to a clearer picture of the mechanism of volcanism have been carried on by geophysicists and geologists of the Geophysical Laboratory of the Carnegie Institution of Washington. Together with the work of other scientists, these studies aid understanding of conditions at the bottom of the earth's crust.

The present distribution of these fire mountains gives a clue to the mechanism responsible for them. With very few exceptions they are found in regions where there are very great variations in altitude, with lofty mountains alongside abysmal ocean depths. This is the case, for example, around most of the Pacific basin.

Reaction To Restore Balance

Where such irregularities exist, weaknesses in the crust of the earth may be inferred. They are shown, in fact, by other evidence, such as anomalies in gravity. There is constantly in progress a redistribution of the materials at the bottom of the granitic crust and the 25-mile-thick shell of basalt underneath. This is a natural physical reaction, to restore balance. An extremely heavy mass at one point tends to push up the somewhat plastic rock beneath it through any crack which happens to develop because of the overloading.

The same basic mechanism is responsible for earthquakes. It is noteworthy that volcano regions also are earthquake regions. The reverse, however, does not hold, and some areas which are subject to severe shakings from time to time never have experienced volcanism. The association is highly suggestive and indicates that the volcano is a more specialized phenomenon than the earthquake.

Just what happens in the earth's depths, of course, can only be conjectured, but more and more plausible hypotheses to account for the fire mountains are resulting from continued observations.

A much debated problem has been the source of the molten rock.

The temperature of the earth's interior as is well known, increases with depth and pressure. The rate of increase is about 30 degrees centigrade per kilometer on an average, although it varies enormously with local conditions. At one place in South Africa the gradient is 90 degrees per kilometer. But, assuming that this gradient continued unchanged, it would be necessary to go far towards the earth's center to encounter temperatures sufficient to melt rock.

Giant Thermos Bottle?

But the earth originally was a molten mass, presumably torn out of the surface of the sun in some titanic cataclysm. Did all the heat of this enormous ball escape into space as the earth cooled? A logical hypothesis is that the cooling reaction caused a very rapid crystallization and solidification of the first few miles of the surface. This proved a fairly good insulating material through which heat from the interior could escape very slowly. Thus the planet might be pictured as a giant thermos bottle.

So the rocks 15 to 20 miles down may still be molten. This does not mean that they are liquid. They are under enormous pressure, sufficient to keep them in the solid state in spite of their intrinsic heat. But there must be a critical point where this pressure is barely enough—where, if it were relaxed a trifle, the rocks would become liquid.

There are two types of volcanoes, and each emits its characteristic type of lava—the basaltic, of low silica content, and the andesitic and rhyolitic, of high silica content.

The first is characteristic of some of the largest and best-known fire mountains, notably Kilauea in Hawaii. Hot molten rock seeps from the earth's depths, cools, and builds great mountains. There seldom is a violent explosion. The lava contains a relatively large percentage of iron and other metals combined with silica. Such materials have considerable fluidity at the temperature of 1,100 degrees centigrade noted during eruptions of the basaltic type.

Now it is known that immediately below the granite crust of the earth there is a layer of basalt. The pressure ordinarily is sufficient to keep it rigid. But there are various ways in which this pressure could be relaxed in specific localities. It would be reduced by long continued erosion of heavy mountains. It would be released almost entirely by a crack in the crust due to grossly unequal weight distribution.

Would Push Liquid Up

Under such conditions, with a vent to the surface open, the pressure of the crust on all sides would tend to push the liquid upwards to the surface with just such a seepage phenomenon as is observed at Kilauea. There is no need to assume continuously existing pools of molten basalt in the depths of the earth, as has been done by some geophysicists in the past. Merely a considerable release of pressure over a limited area without a corresponding loss of heat would turn part of the planet's inner shell into a liquid.

The "pool" hypothesis, however, need not be entirely discarded, say Carnegie geophysicists. Such subterranean lakes of molten rock may exist. The normal balance between temperature and pressure could be disturbed in several ways. One mechanism would be a concentration of heat-producing elements, such as uranium and thorium, in a limited area at the bottom of the crust. Another would be a blanketing effect—the piling up of extraordinary amounts of light but effectively insulating material at some place on the surface, say a mountain range.

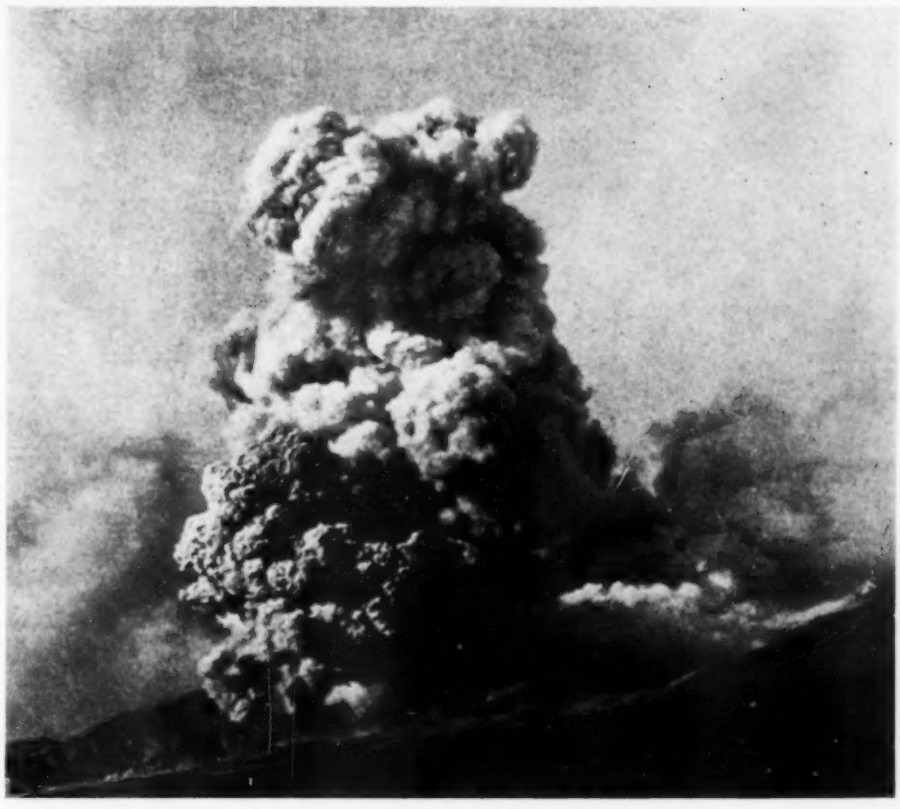
But this type of volcano is an exception. A more complex theory is necessary to account for the best known type, those which at intervals belch forth with explosive violence great masses of siliceous lava. The most notable element in this is silica. It is also the most notable element in the granite crust of the earth. Such lavas are, by contrast with the

basaltic lavas, exceedingly viscous at the temperature of about 1,100 degrees centigrade which prevails during an eruption. The composition of the lava is about what would be expected for rocks melted at the bottom of the earth's outer crust.

A silicate composition differs notably from basalt. It has been determined in the past few years that silicate rocks, such as obsidian and granites, contain some water and various gases such as hydrogen sulfide and carbon dioxide. These are held in solution, bound up very closely with the molecules of the rocks under pressure. They can be released by melting and the amounts measured by various chemical methods.

Presumably these same substances are in solution in the solid-liquid state ten or fifteen miles below the surface. There is a release of pressure, just as in the case of the basalt. The siliceous mass becomes liquefied. In the process some of the gases, and especially the bound water, escape.

With the intense temperature found at such depths, the result is an enormous pressure of steam, too much for the lid of the kettle. There is a steam boiler explosion, with the eruption breaking through at the weakest point in the crust. Volcanoes of this type are Etna and Vesuvius in Italy and those of Iceland, Mexico, Japan, and Central and South America.



PILLAR OF FIRE

This glowing cloud flowing down the slope of Mt. Pelee on Martinique was photographed by Frank A. Perret of the Carnegie Institution of Washington.

Express Train Speed

Titanic glowing clouds of finely divided matter are shot into the air with extreme violence and express train speed. They sink over vast areas of countryside, and all life may be wiped out under the fiery blanket they lay down. This cools rapidly to form a cinder-like pumice. The explosive elements in the original molten material are now a subject of major study, and what happens is still far from clear.

The actual eruption of a volcano is extremely picturesque and often tragic. The most striking feature is the pillar of cloud which arises from the crater. The closest observations of these pillars of cloud were made at the paroxysmal eruption of Mt. Vesuvius in 1906. They were emitted in three stages. The clouds of the first stage ascended to great heights and were composed of glowing particles mixed with much dark material. The former presumably came from the molten lava, the latter from detritus blown from the cone of the mountain itself.

Flashes of lightning shot through the cloud. The explosive force of the gases increased and carried it to still greater heights. As the eruption progressed, it became almost black as more material was blown from the crumbling cone. Here the volcanologist Frank A. Perret photographed for the first time what he described as "flashing arcs."

These were luminous circles which appeared at the beginning of each explosion and were repeated at intervals of about two seconds. They progressed upward and disappeared. They never have been explained satisfactorily.

Dense Clouds

This first period of activity continued for about three days and was followed by a period during which there was continuous and powerful expulsion of gases carrying only a small amount of solid particles. The cloud ascended to about 13 kilometers. The third period followed the second in a few hours and lasted about three weeks. There were intermittent, paroxysmal expulsions of pillars of cloud that were often so dense they literally flowed down the mountain. These carried electrical charges opposite to that of the earth, as was shown by brush discharges from the metal buttons worn by attendants bold enough to walk through them.

The same type of clouds was observed in the eruption of Mt. Pelee on the island of Martinique, which engulfed the populous town of St. Pierre. Here the first clouds reached such proportions that, in spite of the enormous explosive force with which they were expelled from the mountain, gravity promptly asserted itself and they rolled down the slopes with appalling swiftness.

Carried Hundreds of Miles

The finer material in a pillar of cloud is carried off by the winds, often hundreds of miles. When the force of the explosion is sufficient to project it into the upper atmosphere, it may be held in suspension for several years and carried around the world. Sunsets are more colorful for a time, and the heat received by the earth from the sun a trifle less. The coarser particles promptly fall to the earth. Boulders several feet in diameter will be found near the vent, whereas finer dust particles may be precipitated many miles away.

CHEMISTRY

Experiments With Kitchen Chemicals

These Would Provide Fun for Your Friends

SCIENCE
Serving Science Clubs of Am Sp

By JOSEPH H. KRAUS
Science Clubs of America Editor

EVERY KITCHEN has a plentiful supply of chemicals. Salt is sodium chloride; baking soda is sodium bicarbonate; borax is sodium tetraborate; cane sugar is sucrose; washing soda is sodium carbonate. Then, too, we will find many other chemicals in the home medicine cabinet or among the washing preparations such as ammonia, bleaching powders, cleaning fluids and iodine, alcohol, etc. With these many interesting experiments may be developed.

Steel wool is used in the average home for scouring pots and pans. Steel wool in the presence of water oxidizes rapidly, that is, it rusts. This rusting is the result of oxidation. We can prove this easily. A small bundle of steel wool is soaked in ordinary household vinegar. The vinegar is then shaken out of the steel wool and the steel bundle is pushed into the bottom of a milk bottle. This prepared bottle is inverted in a bowl of water on two match sticks as shown at 1. To accentuate the dramatic effect the water may be colored with a couple of drops of ink. Air contains approximately 80 per cent. nitrogen and 20 per cent. oxygen. After a day or so, most of the oxygen in the bottle will be consumed and the water will rise to take its place. Meanwhile, the steel wool rusts. This rusting stops when four-fifths of the original air remains; namely, the four-fifths of the atmosphere which contains the inert nitrogen.

The next time you have occasion to cut the rind from an orange or lemon, bend it with the skin side out, and press between the fingers, directing the action toward a candle or other flame. Brilliant sparks of light will be produced. These result from the burning of the oils projected toward the flame with considerable force when pressure within the tiny cells of which the skin is formed increases and the cell walls burst suddenly. Direct the action toward your face or tongue and you will be able to feel or taste the minute droplets.

Osmosis is the name by which is known the phenomenon of passage of fluids of different densities through a membrane. An ideal membrane for this purpose is the one contained in an ordinary egg. With a needle drill a hole through the top of the smaller end of an egg. Suck out the contents (they won't harm you if the egg is fresh); but if you do not like raw eggs you can shake the contents into a cup. Tap the round end of an egg gently, cracking the shell. Then, with a pair of tweezers, break off pieces of shell but leave the membrane intact. Attach a glass straw to the top of the egg using sealing wax or paraffin for this purpose. With a medicine dropper fill the egg with a strong solution of sugar dissolved in water. Then, support the egg in a dish of plain water. Soon you will notice that the contents of the egg increases. The sugar solution will pass through the membrane into the surrounding water. But a greater quantity of water will pass into the egg. This is osmosis. Try the same experiment with prunes. Drop a dried prune into a glass of plain water; place another in a glass of strong sugar and water. You will observe that in plain water the prune swells while the one in sugar water remains wrinkled. Can you tell why?

Place a teaspoonful of rubbing alcohol (pure alcohol is best) in the bottom of a saucer. In this dissolve a pinch or two of table salt. Add a small tuft of cotton about the size of a walnut. Light with a match. You will observe the bright yellow flame of sodium. Repeat this experiment in a dark room and look at the face and color of clothes worn by your companions. Also, examine a colored magazine cover under the sodium light. For other colors of flame, purchase a small quantity of barium sulphate, strontium nitrate and copper sulphate, from your corner druggist and repeat the experiment with each of these salts. Instead of a yellow flame you will get green, red and blue colors.

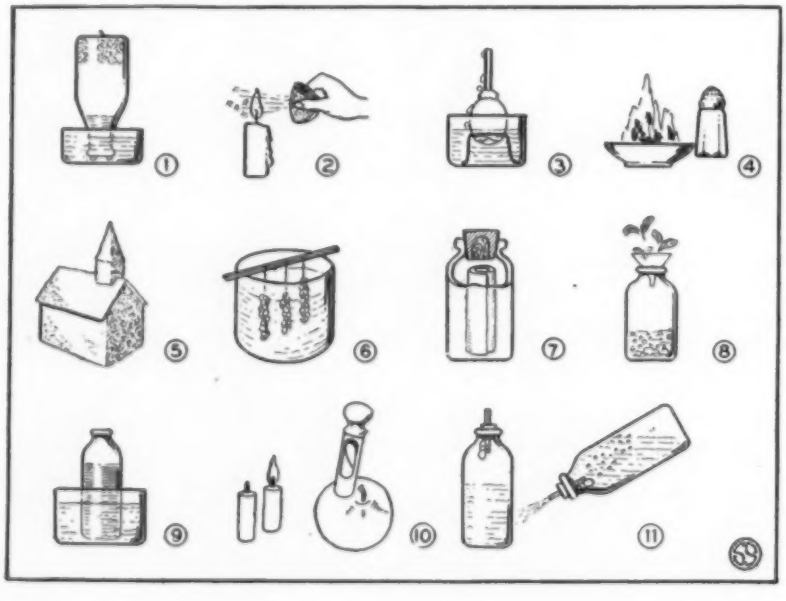
Make a small house, castle or church from cardboard and cement the pieces together with airplane cement. Unless you use a waterproof glue, the structure will come apart. Weight this model with a small stone and immerse it in a solution of sugar and water. Dissolve as much sugar as the water will hold. Within 24 hours you can remove a beautiful crystalized building covered with brilliant, large crystals of sugar. (See 5.)

Repeat the experiment except that you suspend white twine in the sugar solution. In this manner you will produce rock candy. You can color the rock candy by using any certified coloring solution. (These are usually found in the home and are employed in the making of cakes and cookies.)

Write a number of messages on as many separate sheets of paper. The ink you use for these messages should be a very weak solution of copper sulphate (obtained from your druggist) dissolved in water. The pen you use preferably should be a pointed piece of wood. This writing, when dry, should be absolutely invisible. Ask a friend to sign one of the blank sheets and insert it into a bottle. Stopper the bottle with the especially prepared cork. This is an ordinary cork hollowed out to receive a tuft of cotton which has been saturated with ordinary strong ammonia. The ammonia fumes inside the bottle will develop the writing and your friend will be mystified by his "fortune" which appears above his signature. (See 7.)

Pour some vinegar into the bottom of a bottle. Insert a funnel into a hole in a cork which fits this bottle. Make up a few butterflies either by cutting them out of thin tissue or by tying small feathers together as shown at 8. When ready for the experiment, dump a teaspoonful of bicarbonate of soda into the funnel. Carbon dioxide gas will be produced rapidly and as this escapes through the funnel, the butterflies will flutter up and down.

Dissolve a teaspoonful of cornstarch in a pint of water and to this add a drop or two of iodine. You will find that



E OBSERVER

of Am Sponsored by Science Service

the solution turns blue. (This blue color produced when iodine is added to starch is a test for starch.) Place a pot of water on the stove and put in it the bottle with its contents, as shown at 9. Allow the water to come to a boil and heat the contents of the bottle in this fashion until the blue color disappears. Set this bottle on the table in the presence of your spectators. As the contents cool the blue color returns.

You can add a little humor to your presentation by cutting cylinders from an apple. For this purpose an apple corer may be used; even better is an ordinary metal tube. With a sharp knife cut off the top and bottom of each section squarely. In the top of each apple cylinder insert a small piece of any kind of nutmeat. When ready for the demonstration light the nut. It will burn for some time and from a short distance the arrangement will look like a genuine candle. Pop the candles into your mouth one at a time and devour them, flame and all. You will not be burned if you exhale through your mouth while inserting the apple into your mouth. Close mouth promptly. This is bound to get a laugh.

The construction of a fire extinguisher is shown at 11. This consists of a one-hole stopper, preferably containing a glass tube. To this tube is attached, with a rubber band, a package made from ordinary tissue paper containing bicarbonate of soda. In the bottom of the fire extinguisher is ordinary vinegar and water, half and half. When the fire extinguisher is inverted the vinegar rapidly penetrates the tissue paper and acts upon the bicarbonate. Gas is produced which fills the inside of the bottle and ejects the contents of the bottle forcibly.

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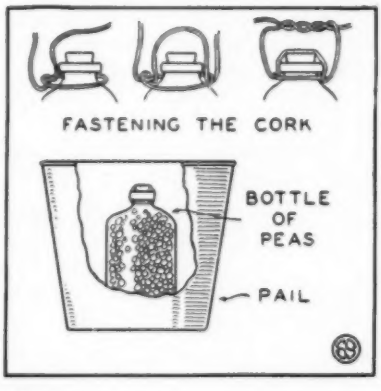

PHYSICS

The Strength of Peas

FILL A SMALL BOTTLE with ordinary dry peas or beans. Then add water so there is no air space left in the bottle and cork the bottle tightly. If the bottle is provided with a screw cap, you will have little difficulty in making a perfect seal. If an ordinary cork is used, however, this cork should be tied in place. The illustration above shows a simple method of fastening a cork in a bottle. Ordinary twine is used for this purpose. By pulling down on the ends of the cord, the twist, which substitutes for the knot, will be imbedded in the top of the cork and the string will not slip.

Set this arrangement in a pail. Overnight the swelling peas will exert so much pressure on the inside of the bottle that they will burst the glass.

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NEWS OF CLUBS

WASHINGTON—The dedication of the new Science Service building with Vice-President Wallace speaking is an important occasion for Science Clubs of America. It is suggested that clubs arrange to meet at that time (Saturday, Dec. 13, 1:30 p. m. EST) around a radio tuned to a nearby CBS station. See page 354.

STAUNTON, Va.—Amazing as it may sound the Science Club of the Virgina School for the Blind is studying photography this year. The group has been interested in science for some time; in fact, in addition to its affiliation with Science Clubs of America, the group is a charter member of the Virginia Junior Academy of Science. The sponsor of the club is Robert E. Bruce, Teacher of Science and Mathematics.

WILMINGTON, Del.—The Science Club of Henry C. Conrad High School has an enrollment of 86 members. The club is divided into two sections; one devoted to physics and chemistry and the other to biology. Each of these sections meets separately for projects and general meetings. However, special events are arranged to enable the entire membership to get together. Each group works upon projects and demonstrations which are presented to elementary school science classes. These aid local teachers in giving demonstrations of simple principles of physics, chemistry and biology. "This club will cooperate and do everything in its power to aid in the development of a Science Center in the state of Delaware," reports G. Emmett C. Kauffman, Instructor in Chemistry and Physics and sponsor of the club.

ST. LOUIS, Mo.—Among the general science activities conducted by members of the Bayless Science Club, Bayless High School, are listed such interests as taxidermy, radio, photography, aviation and projects in biological and physical sciences. This group is sponsored by Marcus Mitchell, Science Teacher, who previously sponsored the Rich Hill, Mo., High School Science Club.

SOUTH BEND, Ind.—Tentative plans for a Science Fair have been formulated by the Riley Senior Science Club of the Riley Junior-Senior High School. Meeting once a week, the club alternately devotes one week to laboratory experiments and demonstrations and the next week to reports on recent scientific advances. This plan has been very successful, according to the report from C. C. Schubert, Head of the Science Department and sponsor of the club.

SAULT STE. MARIE, Mich.—A science club has been in existence for the past fifteen years at Central High School. Activities of the Atom Crackers, as this group is known, are greater this year than ever. Present interests are the soilless growth of plants, ultra-violet light experiments, photography, chemical stunts and serious chemical projects. This group is sponsored by Aurid Dean, Head of the Science Department.

Clubs are invited to become affiliated with SCA for a nominal $2 for 20 members or less. You can become an associate of SCA for 25 cents, which includes a copy of the 128-page Science Handbook for 1942. Address: Science Clubs of America, 1719 N St., N.W., Washington, D. C.

HORTICULTURE

How To Keep Indoor Plants Watered in Your Absence

THE CHRISTMAS and Easter holidays will find many of us away. At this time the question always arises: "How are we going to care for the growing plants on the window sills or in a small greenhouse while we are away?"

A most satisfactory method is illustrated in the accompanying diagram. The growing plant is put into a larger pot. The area between is filled with moss and a layer of moss about one inch deep also covers the soil. This moss is well wetted down just before we leave for our vacations. When we return we will find that our plants have been kept in good condition.

Plants which require a greater quantity of moisture may be treated as in the second illustration. Here we can use gallon jugs with the tops cut off. The hole in the bottom of the flower pot is plugged with a cork and the potted plant is then rested on a layer of sand. The surrounding water will seep through the pores of unglazed and unpainted clay pots. This method is not successful with plants growing in glass or non-porous pottery.

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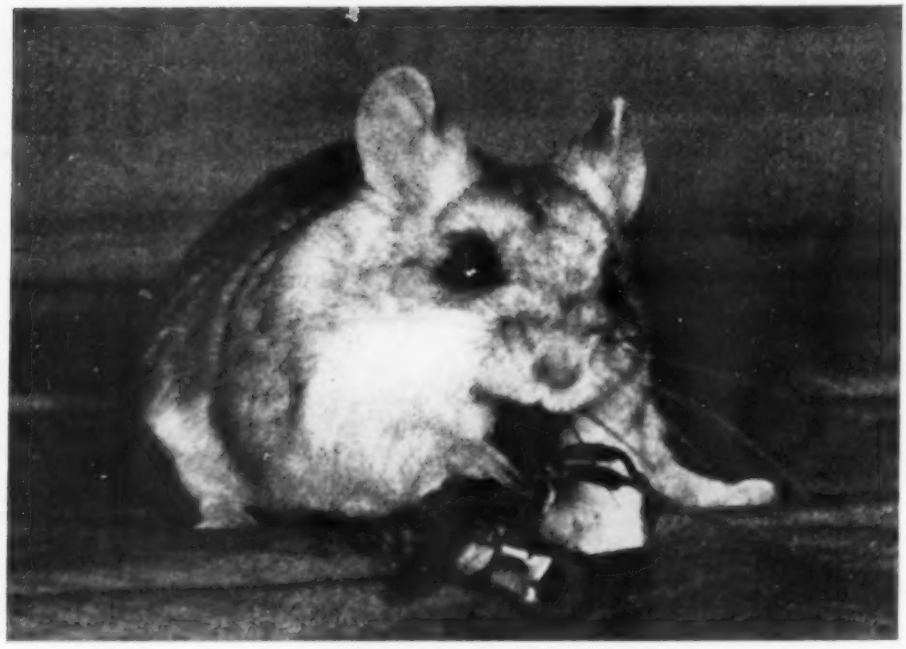
SCIENCE CLUBS OF AMERICA

SCA, under Science Service sponsorship, continues the pioneering activities of the American Institute of City of New York over the past 15 years and the Student Science Clubs of America which was merged with that movement. The American Institute continues to foster the regional activities of the junior clubs of the New York City area as a science center.

To effect close cooperation between the American Institute and Science Service, an advisory committee on SCA is being formed.

The principal SCA staff consists of Joseph H. Kraus, SCA editor, and Margaret E. Patteron, SCA membership secretary, based at New York in offices at 310 Fifth Avenue, also occupied by the American Institute, H. D. Lufkin in charge, and its Science Laboratory, Henry Platt directing.



PREDATOR AND PREY

In the little jungles of the grasses underfoot, there are many beasts of prey as fierce, for their size, as tigers; none more so than the grasshopper mouse.

PHYSIOLOGY

Blood Chemical May Cause Hay-Fever Symptoms

New Evidence Points to Guilt of Histamine, Already Under Suspicion; Formed by Blood of Allergic Persons

NEW evidence that a chemical released by the blood cells may be partially responsible for some of the strange symptoms of hay-fever and other allergies, is reported. (*Journal, American Medical Association,* Nov. 22.)

Using human blood, two physicians of Tulane University of Louisiana School of Medicine, found that the cells produced histamine in the presence of giant ragweed, housedust and timothy extracts.

Histamine is a chemical which stimulates the autonomic nervous system—over which we have no voluntary control. When histamine is injected into the skin, it produces the familiar "wheal" suffered by some allergy patients. It has long been suspected that this chemical may in part be responsible for many of the clinical symptoms of allergy.

Experiments with animals supported this suspicion, and encouraged Drs. Gerhard Katz and Stanley Cohen of Tulane to test blood taken from allergy patients and non-allergic persons.

When extracts of ragweed, housedust or timothy were incubated with blood of non-allergic persons, no histamine production was noted. When, however, the blood of a person sensitive to one of the irritants was similarly tested, the histamine level then rose considerably.

Further, the reaction was specific. That is, if the patient were allergic to ragweed, but not timothy, his blood produced histamine only in the presence of the ragweed extract, not timothy.

The two physicians concluded that the amounts of histamine released from the blood cells in contact with the irritant could be large enough to cause some of the symptoms of allergy. They asserted:

"We may assume that at least at points of high concentrations of allergens (irritants), such as the tissues of the respiratory or digestive tracts, the histamine released from blood cells circulating through these areas should, to a certain extent, contribute to some of the local tissue reactions."

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ZOOLOGY

Fierce Wild Mice Hunt For Prey Like Hounds

FIERCE wild mice that hunt like hounds, pounce on their prey like tigers and hang on like bulldogs are described in the new Smithsonian annual report by Ernest P. Walker, assistant director of the National Zoological Park.

They are the little rodents known as grasshopper mice, common in the Southwest. Like other rodents they eat seeds and other vegetable food, but unlike most other kin-animals they prefer a meat diet, preying on large insects and small mammals and lizards. They get their name from their fondness for grasshoppers and their success in catching them.

"It follows a fresh track like a hound," Mr. Walker states, "makes a slow and very careful approach, and when within reach, grabs its prey, usually with its teeth but sometimes with its hands. This action is so quick that the human eye can scarcely follow it . . . If the victim is a mouse or other creature nearly that size, the attack is particularly savage, much like that of a little bulldog, although the grip is not quite so tenacious, the hold being occasionally changed to obtain a more effective killing grip."

Mr. Walker has a pet grasshopper mouse, as well as several other wild mice, including a couple of pocket mice and a kangaroo rat. The latter animal, like its big but unrelated Australian namesake, does most of its traveling by tremendous leaps and bounds on its long hind legs.

These small rodents are often credited with being voiceless, but Mr. Walker has found that they have tiny voices that tax even a reasonably acute human ear to

hear them. He is of the opinion that there are no completely dumb animals. It is we who are deaf, rather than they who are dumb, he holds.

Desert mice, and many other animals that live in arid regions, are able to get along without drinking, and even without eating juicy leaves. Mr. Walker continues. They may lap up dew occasionally, and get a few "greens" during the brief seasons of quick growth that sometimes come in the desert, but at need they can live and thrive entirely on dried foods. Their physiology is so adjusted that water is manufactured in their bodies out of other hydrogen-oxygen compounds.

"I have often offered water to pocket mice, kangaroo rats, grasshopper mice and other desert animals to make certain that they did not suffer from lack of moisture," he says. "Almost invariably they refuse it, though occasionally they may sip a little and then not touch water again for months."

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GENERAL SCIENCE

Unity of American Cultures Sought in Havana Conference

Exchanges of Students, Teachers, Scientific Leaders Among Steps For Bettering International Relations

AN historic forward step in cooperation and understanding among the nations of the Western Hemisphere has just taken place in Havana. National Committees on Intellectual Cooperation from nineteen American countries met to discuss ways of bringing this unity about.

A tri-lingual hemisphere is envisaged by Dr. Antonio S. de Bustamante of Cuba, who stated that understanding of one another's languages was the first essential of friendship and unity between our nations. He asserted that Spanish and Portuguese should become "second languages" of the United States, as English is fast becoming the second tongue of Central and South American states. When we can freely converse, we can cast off our suspicions of one another, read the literature of other Americans and develop a family spirit, he affirmed.

Dr. James T. Shotwell, head of the delegation from the United States, stated that the preservation of freedom throughout the world was the ultimate objective of the historic conference. He said it was impossible for cooperation and unity to be imposed upon peoples; that it must spring from a genuine appreciation of the achievements of one another. "The peace settlement of the present war must include strong measures for cultural cooperation among nations," he concluded.

The development of science and scientific societies among the American republics was brought up in a resolution presented by the delegates from Peru. The proposal is for a series of international literary and scientific competitive contests, with money to be contributed by their respective governments. Prizes of $8,000 and $2,000 would be awarded each year for the most outstanding literary and scientific works.

In addition, proposals have been drafted by the conference calling for widespread exchange of students, teachers and scientific leaders among the American republics during the coming years. Selection of these would be on the basis of scholarship merit, character, ability to profit by the experience, and familiarity with the language of the country.

Resolutions were offered condemning the treatment of many scholars and scientists in occupied countries of the world today, and asking that the governments of the American nations offer every possible facility to exiled scientists and scholars, and give them freedom of movement among the several American states.

This conference marks a milestone in inter-American relations, and proposes to set up means of free exchange of various scientific and cultural works, educational films, and works of art and music. Changes in copyright laws, to give better protection to writers, were recommended.

Transfer of the scientific and cultural societies of the world to the Western Hemisphere was forecast by the Congress which voted to invite to the New World the International Sci- *(Turn to page 366)*

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ANTHROPOLOGY

Russian Scientist Restores Human Likeness to Skulls

Faces of Bronze and Stone Age People, as Well as Famous Historical Characters, Made Real for Moderns

NOT ALL news from Russia is war news. In a Leningrad Laboratory, a sculptor-anthropologist has been taking skulls of famous Russians dead a thousand years and building faces on them with such success that an exhibit of 40 of his portraits was to be a scientific event of this year, according to a report received from Moscow.

Since before the first World War started, this scientist, M. Gerasimov, has been experimenting with a process of revealing features of the dead from gaunt evidence in skulls. One of his early portraits of a long dead character proved to be a recognizable likeness when matched to photographs that unexpectedly came to light. Encouraged, M. Gerasimov has since modeled faces on a number of skulls of famous Russians of the past, and also on more ancient prehistoric skulls of Russia's Bronze and Stone Age inhabitants.

Famous skulls entrusted to the anthropologist for his portrait experiments include that of Grand Duke Yaroslav the Wise, who ruled from Kiev in the eleventh century. Yaroslav built in Kiev the oldest Russian cathedral, an impressive green and white church with ten cupolas spangled with stars, and with mosaics which included a great figure of the Virgin 15 feet high.

One of the anthropologist's latest portraits is that of the Azerbaidjan poet Nizami, who lived in the twelfth century and is famed for his romantic and semi-historical tales in the epic manner. Nizami's skull, kept in a special repository in Baku, provided evidence for a portrait showing how the poet looked at his death, in the 64th year of his life.

M. Gerasimov bases his portraits on his preliminary study of the anatomy of the soft tissue of the human face and X-ray pictures of the head. Using facts thus obtained, he measures a skull, makes sectional sketches and drawings to indicate contours, and then turning sculptor, applies modeling clay to the skull according to the data. The sculpture is cast in plaster of paris or porcelain, and the modeling clay is removed from the skull—which goes back to its bony state and its resting place.

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From Page 363

entific Union, with headquarters in London, the International Union of Academies, formerly located in Brussels, the International Committee of Historical Sciences, the International Library Association, and all other world cultural associations now suffering from the hindrances of war.

Such large-scale transfer of scientific and historical associations would make this continent the world's center of learning. It would make the Western Hemisphere the coordinating center for all scholars and educators.

The Congress voted to offer locations for these societies in various American republics. With the decline of scientific research in Europe, it was felt, obligation and opportunity come to the New World to take over this function.

Also voted by the Congress of Government Representatives was a motion to recommend special passports and travel credentials for teachers, scientists, and newspapermen, as these persons are especially qualified to spread mutual understanding and to create good-will among the nations of the Americas. Newspapermen were referred to as "professors of the popular masses" and "directors of public opinion." Special passports, and reductions in travel fares, would make possible a wider exchange of these men among our American republics and speed the day when we shall work and plan together for the Western Hemisphere.

Free entrance for all books and printed publications from country to country was urged in order to further mutual understanding by reducing costs. A commission was set up to compile a list of the most important books in each American Republic, and it is planned that these shall be published, one by each country, under the title, "Literary Masterpieces of the Americas." They would be printed in their original language, and also in translation. This would make it possible for a Pan-American literature to be developed.

Bureaus for disseminating medical information were also recommended, so that hygiene and public health discoveries of one country would be available to the others. An All-America Radio Office has already been established in Havana as a clearing center for all long and short wave programs between the Americas.

The conference took a firm stand against the oppression of totalitarian countries and the abuse of scientific and literary persons in those countries, and recommended that domicile be given as many of these men as possible in the New World.

Because the question of copyright on printed materials has caused confusion in the past, a special committee was set up to work out a plan for better protection of literary works, songs and other works when circulated from country to country.

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PSYCHOLOGY

Howler Monkeys Have Better Foreign Policy Than Man

HOWLER monkeys have a better foreign policy and scheme of international relations than science has yet taught man to use, Dr. Edward L. Thorndike, eminent educational psychologist of Teachers College, Columbia University, told a luncheon meeting of the Psychological Corporation honoring its founder, Dr. James McKeen Cattell, pioneer psychologist. Prof. Thorndike said:

"The howler monkeys manage the matter as follows: For the most part, each nation stays in its own territory, minding its own business.

"If one nation encroaches upon another's territory, the invaded nation meets them with a vigorous attack of howls.

"The invaders howl back.

"The contest continues until, by a beneficent provision in the brain of the howler monkey, the side that is outhowled is moved to retire. Not a drop of blood is split; not an atom of food or shelter is destroyed. No blot stains the national honor, since each citizen howls his loudest until his inner nature says 'Hold! Enough!' or 'Howled Enough!'

"The absolute justice of this procedure is dubious, since there may be a very low correlation between rightful ownership and vociferousness. But the outcomes are surely far better than in man, where the large wins over the small, the bellicose over the peaceful, and force over reason.

"It is an elementary principle of psychology that we should not try to dam up and push back the energy and passions of men, but should rather direct and entice them into desirable channels. It has been the world's tragedy of the last half century that effort was not made and ways were not found to encourage the energy and ambitions of the German people and of their rulers toward lines of action that would be good for them and for the rest of the world.

"It is perhaps impertinent to suggest that our governments should study psychology. But I can at least recommend that psychologists study government.

"If we do the work we should do in that field, we may hope to see psychologists attached to Departments of State."

Science News Letter, December 6, 1941

Aids to Research

RESEARCH in applied psychology will be aided by a series of grants established in honor of Dr. James McKeen Cattell by the Psychological Corporation.

First of the grants will be made in 1942, when four awards of $250 each will be made to graduate students with the best plans for experimental work.

Dr. Paul S. Achilles, vice-president of the Psychological Corporation, announced the establishment of the grants at the meeting.

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INVENTION

New Machines And Gadgets

Novel Things for Better Living

Passengers on moving trains and airplanes may be entertained by radio programs from London, Berlin, Rome, and Moscow if short wave equipment recently tested is installed.

Clearer transparent cellulose sheeting, of the non-inflammable type cellulose acetate, is made by use of a newly patented method. A small amount of sulphuric acid is incorporated in the wood pulp from which the cellulose is obtained.

One may wonder what use a machine for picking clover tops might be. But red clover blossoms are dried and used in medicines, chiefly for treating colds. American druggists use about 20 tons of them every year, hitherto imported from abroad. Scientists who developed the machine believe that it can be adapted for harvesting 200 other medicinal plants, many of which grow wild in this country. One machine does the work of 2400 hand pickers.

A window through which you can speak, but which you cannot get through or even stick your hand, is an invention recently patented. The glass is set in an outwardly flaring metal frame, with an air space between the front and back sides of the frame. On both the front and back sides, the frame is perforated all around with small holes, but the two sets of holes are offset. You can't even pass a rattail file through to the other side. The window is intended for institutions where inmates may communicate with visitors or attendants on the outside but must have no direct contact with them.

Amateur photographers, who would like always to have their latest and best work framed and hanging on their walls, but find it too bothersome to take the frames all apart and paste them up again, will welcome a demountable frame that has recently won a patent. The four sides are held together by removable corner pieces so that it can be taken apart and put together again in a jiffy.

Just a lineman climbing a pole! So what? Well, the unique thing about this particular lineman is that he is less than four inches tall but in the Army. The pole he is climbing is 18 inches high. Nevertheless, he is provided with a complete set of lineman's tools, even to a tiny roll of insulating tape, accurate in every detail despite their fraction of an inch size. He is actually supported on the pole by "gaffs" or

spikes. Pole and lineman and all the equipment were made by Work Projects Administration workers on the New Jersey Arts and Crafts Project, to assist the United States Army Signal Corps in training recruits. It is only one of a number of miniature set-ups made or under construction by WPA workers. Another is a model teletype, exact duplicate of the original machine, which actually works, but at 1/1800th of the speed of the original so that the recruits can see just how it works.

A steel "igloo" built entirely of steel plates welded together houses the lunchroom of a Chicago steel plant. Its dome-shaped interior, 108 feet in diameter and 28 feet high, is unbroken by beams, trusses or posts. Windowless, it is air-conditioned. This unique structure is believed to be the first of a new breed of buildings.

If you want more information on the new things described here, send a three-cent stamp to SCIENCE NEWS LETTER, *1719 N St., N. W., Washington, D. C., and ask for Gadget Bulletin 82.*

Science News Letter, December 6, 1941

Peanut oil is a source of glycerine for munitions.

While *cave* hunting in southwest England, students of Bristol University in 1939 discovered a huge chain of caverns with beautiful stalactite formations.

Poison gas was used in Spartan-Athenian fighting in the sixth century, B. C., when Spartans soaked wood in pitch and sulfur and burned it under city walls, thus freeing asphyxiating gases.

PLANT PATHOLOGY

NATURE RAMBLINGS

by Frank Thone

Not Guilty

RED CURRANTS can safely be grown in parts of the country where their close cousins, European black currants, wild currants, and both wild and cultivated gooseberries, have to be eradicated to keep them from spreading the infection of white pine blister rust. This is the conclusion of Walter H. Snell of the New York Department of Conservation, based on extensive field studies by himself and other foresters. (*Journal of Forestry,* October)

White pine blister rust, the most destructive disease of white pines in this country, is caused by a parasitic fungus that spends part of its life cycle on the leaves of currant and gooseberry bushes, going from them to the pines, just as mosquitoes "entertain" the parasites that later cause malaria in man.

Because of this harboring of the rust fungus, currants and gooseberries have for some years been under the ban in the white pine areas of this country. While it had been noted that red currants seemed less susceptible than other species, their destruction when within 900 feet of white pine trees had been decreed, just to play safe. Now, in Mr. Snell's opinion, it is safe to let the bushes grow, even in the close vicinity of the valuable trees.

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● RADIO

Saturday, December 13, 1:30 p.m., EST

On "Adventures in Science," with Watson Davis, director of Science Service, over Columbia Broadcasting System.

Vice-President Henry A. Wallace will give the principal address. See page 354.

Listen in each Saturday.

Monday, December 15, 9:30 p.m., EST

Science Clubs of America programs over WRUL, Boston, on 6.04 and 11.73 megacycles.

One in a series of regular periods over this short wave station to serve science clubs, particularly in high schools, throughout the Americas. Have your science group listen in at this time.

•First Glances at New Books

MEDICINE

SINUS—Russell Clark Grove—*Knopf,* 188 p., $2. A popularly written book by a Manhattan nose and throat specialist which tells the layman what and where his sinuses are, how they become infected, and what an intelligent physician can do for him. It clears up much current nonsense about "sinus trouble", including the common belief that no doctor can cure it. Dr. Grove notes incidentally that the correct name for "sinus trouble" is sinusitis, since it is an inflammation like laryngitis. The book should answer most questions for America's host of sinus sufferers.

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AERONAUTICS

AEROSPHERE, 1941, Including Modern Aircraft, Modern Aircraft Engines, Aircraft Statistics, Buyer's Guide—Glenn D. Angle, ed.—*Aircraft Publications,* 308 p., illus., $10.

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HORTICULTURE

GARDENING WITH THE EXPERTS—Noted Authorities—*Macmillan,* 239 p., $2.50. This is a symposium on a number of special subjects, rather than a general comprehensive book for beginners. Chapters treat such topics as wildflower gardens, the herb garden, understanding color, order of bloom, garden sanitation, and amateur flower shows and flower arrangement.

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BOTANY

FLORA ARCTICA: BRYOPHYTA OF CANADIAN ARCTIC, Collection of Father Artheme Dutilly, O.M.I.—Identified and Annotated by William Campbell Steere —*Orders should be sent directly to Rev. Artheme Dutilly, Catholic University of America, Washington, D. C.,* 31 p., 50c. A checklist which bryologists everywhere will find interesting and useful.

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TECHNOLOGY

AMERICAN COTTON HANDBOOK, A Practical Reference Book for the Entire Cotton Industry—G. R. Merrill, A. R. Macormac and H. R. Mauersberger—*American Cotton Handbook,* 1024 p., $4.80. A new reference book, that should prove invaluable to those engaged in the textile industry and to teachers and students in technical schools. It goes into every phase of cotton: historical and economic background, botany and cultivation, details of processing and testing. There is also a useful bibliography of references in English, and an extensive glossary of technical terms.

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HOROLOGY

TIME & TIMEKEEPERS—Willis I. Milham—*Macmillan,* 616 p., illus., $1.98. This book covers the whole subject of Time from the beginnings of history. Famous time-pieces are described and illustrated. The making of watches, their care, repair, accuracy and testing, are described.

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METALLURGY

INSPECTION OF METALS—Harry B. Pulsifer—*American Society for Metals,* 180 p., illus., $1 paper, $1.50 cloth. This is a brief manual for those learning to inspect metals and for those engaged in the inspection of metals for the National Defense.

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ELECTRICITY

LEARNING ELECTRICITY EXPERIMENTALLY—C. S. Siskind—*Burkert-Walton,* 160 p., illus., $2. A series of experiments is described which is adapted to supplement class room instruction in the fundamental principles of electricity and magnetism.

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PHYSICS

THE NATURE OF THERMODYNAMICS — P. W. Bridgman—*Harvard University Press,* 229 p., $3.50. The two laws of thermodynamics and some miscellaneous matters are examined with the object of understanding them. This is best achieved, Prof. Bridgman contends, not by reducing them to a logical system, but by describing the "operations" a physicist employs in applying them — Prof. Bridgman's famous operational theory. The treatment is non-mathematical.

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MATHEMATICS

LECTURES IN TOPOLOGY, The University of Michigan Conference of 1940 — Raymond L. Wilder and William L. Ayres, eds.—*Univ. of Mich. Press,* 315 p., $3. Twelve lectures and summaries of shorter papers presented at the conference on the subject of topology, the mathematics of position rather than of quantity.

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GEOLOGY

POSSIBLE FUTURE OIL PROVINCES OF THE UNITED STATES AND CANADA—A. I. Levorsen, ed.—*American Association of Petroleum Geologists,* 154 p., illus., $1.50. With oil being poured out even more lavishly than blood on the altar of Ares, it is very much to the point to seek possible new sources. As seen by the present author, the principal potential fields lie in the Plains region east of the Cordilleras, all the way from the Arctic coast to the Rio Grande, in the hill country west of the Appalachians and over into the Ozarks, and through the Southeast, including peninsular Florida.

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ENGINEERING

CAREER IN ENGINEERING, Requirements, Opportunities—Lowell O. Stewart—*Iowa State College Press,* 87 p., illus., 75c. This book tells what the young man should know about engineering before deciding upon it as his profession—very useful to those in doubt.

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RADIO

THE RADIO AMATEUR'S LICENSE MANUAL—*American Radio Relay League,* 34 p., 25c. This manual tells the radio amateur how to get his licenses, the rules and regulations with the latest changes, and the answers to questions he will be asked on his examinations.

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MATHEMATICS

GALOIS LECTURES, Addresses Delivered by Jesse Douglas, Philip Franklin, Cassius Jackson Keyser, Leopold Infeld at the Galois Institute of Mathematics, Long Island University, Brooklyn, N. Y. —*Scripta Mathematica,* 123 p., $1.25. Four lectures which treat, among other things, the four-color problem in map making, the fourth dimension and relativity.

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BIOLOGY

THE MICROSCOPE (17th ed., rev.)—Simon Henry Gage—*Comstock,* 617 p., illus., $4. A laboratory classic that has passed through many editions, this work is kept strictly up to date with each new appearance. In this edition, particular attention is given to new possibilities introduced by the electron microscope, and to the use of plastics in mounting slides.

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